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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,249	09/25/2006	Hajime Saito	0033-1107PUS1	7406

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EXAMINER	
GREEN, TRACIE Y	

ART UNIT	PAPER NUMBER
2879	

NOTIFICATION DATE	DELIVERY MODE
05/06/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/594,249	SAITO ET AL.	
	Examiner	Art Unit	
	Tracie Green	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 April 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 8-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 8-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *03/26/2010*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Receipt is acknowledged of applicant's response filed 04/19/2010. Claims 4-7 cancelled by applicant. Claims 1-3, 5-6, and 8-18 are pending and an action on the merits is as follows.

2. No amendments have been made. New grounds of rejection set forth, previous notation of finality is hereby withdrawn.

Claim Rejections - 35 USC 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al. (US 5,998,925) in view of Yamada et al., "Efficient luminescence from Sm-doped ZnSSe-undoped-ZnS multi-quantum wells"

Regarding claim 1, Shimizu et al. (Shimizu, hereafter) teaches (Figures 2, 6 and 16-23) a light-emitting device comprising (100): a semiconductor excitation light source (102) emitting blue-violet light (Column 6, lines 30-35) *(prior art teaches range which includes uv and blue light)*, and a solid material illuminant (101) (column 8,lines4 3-50) that is made up of a medium that transmits the blue-violet light with low loss and an absorbent for absorbing (column 10, lines 15-20) said blue-violet light, the absorbent

containing Sm of 0.01 to 10 mol% (column 13, lines 15-20) (*examiner prior art teaches that the sm content should be between .0003-.08; which not only adds in absorption but improves the temperature characteristic of the device)* wherein said solid material illuminant radiates light by inner shell transition of the Sm contained in the absorbent absorbing the blue-violet light; Shimizu is silent regarding said solid material illuminant medium is selected from the group consisting of GaN, AlN, InGaN, InAlN, InGaAlN, Si_3N_4, GaNP, AlNP, InGaNP, InAlNP, InGaAlNP, GaNAs, AlNAs, InGaNAs, InAlNAs, InGaAlNAs, GaNAsP, AlNAsP, InGaNAsP, InAlNAsP, InGaAlNAsP, ZnSe, and ZnSSe.

In the field of endeavor of display devices, Yamada et el. teaches said solid material illuminant medium is selected from the group consisting of GaN, AlN, InGaN, InAlN, InGaAlN, Si_3N_4, GaNP, AlNP, InGaNP, InAlNP, InGaAlNP, GaNAs, AlNAs, InGaNAs, InAlNAs, InGaAlNAs, GaNAsP, AlNAsP, InGaNAsP, InAlNAsP, InGaAlNAsP, ZnSe, and ZnSSe (Page 937 Column 1, lines 22-23 and Pg 938, column 1, lines 1-5 and Figure 5) (ZnSSe) in order to provide a device with improved emission in the red spectrum as well as improved luminous intensity.

Therefore one of ordinary skill in the art at the time of the invention could modify the device of Cheetham wherein said solid material illuminant medium is selected from the group consisting of GaN, AlN, InGaN, InAlN, InGaAlN, Si_3N_4, GaNP, AlNP, InGaNP, InAlNP, InGaAlNP, GaNAs, AlNAs, InGaNAs, InAlNAs, InGaAlNAs, GaNAsP, AlNAsP, InGaNAsP, InAlNAsP, InGaAlNAsP, ZnSe, and ZnSSe in order to provide a device with improved emission in the red spectrum as well as improved luminous intensity as taught by Yamada et al.

Regarding claims 2, Shimizu teaches wherein said blue-violet light has a peak wavelength in the range of 398 to 412 um (column 6, lines 30-35) (*Examiner note: prior art reference teaches the range of 400-530 nm which includes a portion of the claimed range)*

5. Claims 3 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al. (US 5,998,925) in view of Yamada et al., "Efficient luminescence from Sm-doped ZnSSe-undoped-ZnS multi-quantum wells" as applied to claim 1 and in further view of Henrichs (US 6,625,195 B1).

Regarding claims 3 and 11, Shimizu as modified by Yamada et al. teaches the light-emitting device set forth above (see claim rejection 1). Shimizu as modified by Yamada et al. is silent regarding wherein said a semiconductor laser device having a narrow spectral line width of lasing (claim 3) with an active layer of InGaN semiconductor (claim 11).

In the same field of endeavor of light-emitting devices, Henrichs teaches wherein said is a semiconductor laser device having a narrow spectral line width of lasing (column 2, lines 45-48) with an active layer of InGaN semiconductor (column 2, lines 28-30) in order to provide a device with improved current correction that allows for beam coherence and laser beam divergence (column 2, lines 10-15).

Therefore one of ordinary skill in the art at the time of the invention could further modify the light emitting device of Shimizu wherein said semiconductor excitation light source emitting blue-violet light is a semiconductor laser having a narrow spectral line width of lasing with an active layer of InGaN semiconductor in order to provide a device

with improved current correction that allows for beam coherence and laser beam divergence as taught by Henrichs.

6. Claim 8 and 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al. (US 5,998,925) in view of Yamada et al., "Efficient luminescence from Sm-doped ZnSSe-undoped-ZnS multi-quantum wells" as applied to claim 1, and in further view of Cheetham et al. (US 2005/0077499 A1).

Regarding claim 8, Shimizu as modified by Yamada et al. teaches the light-emitting device set forth above (see claim rejection 1). Shimizu teaches wherein the solid illuminant can comprise a mixture of two or more materials (Column 19, lines 30-35). Shimizu as modified by Yamada et al. is silent regarding wherein said solid material illuminant contains a red phosphor having a peak wavelength in the range of 600 to 670 n , a green phosphor having a peak wavelength in the range of 500 to 550 nm and a blue phosphor having a peak wavelength in the range of 450 to 480 nm.

In the same field of endeavor of display devices Cheetham et al. teaches wherein said solid material illuminant contains a red phosphor having a peak wavelength in the range of 600 to 670 nm (Paragraph 20, line 5) (*examiner note: prior art reveals 580 to 700 for red)*, a green phosphor having a peak wavelength in the range of 500 to 550 nm (Paragraph 20, line 4) (*examiner note: prior art reveals 500-580 for green)* and a blue phosphor having a peak wavelength in the range of 450 to 480 nm (Paragraph 20, line 5) (*examiner note: prior art reveals 400 to 500 for blue)* in order to effectively capture emission from GAN-based emission over a wide wavelengths thus increasing the luminous efficiency of the device (¶5).

Therefore one of ordinary skill in the art at the time of the invention could modify the device of Shimizu wherein said solid material illuminant contains a red phosphor having a peak wavelength in the range of 600 to 670 n , a green phosphor having a peak wavelength in the range of 500 to 550 nm and a blue phosphor having a peak wavelength in the range of 450 to 480 nm) in order to effectively capture emission from GAN-based emission over a wide wavelengths thus increasing the luminous efficiency of the device as taught by Cheetham et al.

Regarding claim 10, Shimizu teaches wherein said red phosphor contains at least either Sm or Eu (Column 12, lines 60-65 and column 13, lines 5-14).

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al. (US 5,998,925) in view of Yamada et al., "Efficient luminescence from Sm-doped ZnSSe-undoped-ZnS multi-quantum wells" as applied to claim 1, in view of Cheetham et al. (US 2005/0077499 A1) as applied to claim 8, and in further view of Juestel et al. (US Patent 6,084,250).

Shimizu as modified by Yamada et al. and Cheetham et al. teaches the light-emitting device set forth above (see rejection claim 8). Shimizu teaches where two or more phosphors are contained in the mixture and contain rare earth elements (Column 19, lines 30-35)

Shimizu as modified by Yamada et al. and Cheetham et al. is silent concerning the red , the blue and the green phosphor each has rare earth elements.

In the same field of endeavor of light-emitting devices, Juestel teaches wherein said red phosphor (for example, YVO_4:Eu), said green phosphor (for example, BAM:

Eu activated) and said blue phosphor (for example, BAM:Eu activated) each contain rare earth elements (Column 4, table 1) in order to provide a device with high color rendering to display light efficient and intense image (Column 1, lines 54-56).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify light-emitting device of Shimizu wherein green, red and blue phosphors each contain a rare earth element, but is silent concerning all the phosphors, red green and blue have rare earth elements in order to provide a device with high color rendering to display light efficient and intense image as taught by Juestel et al.

8. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al. (US 5,998,925) in view of Kelsy Jr. (US 2002/0158267 A1).

Regarding claim 12, Shimizu et al. (Shimizu, hereafter) teaches (Figures 2, 6 and 16-23) a light-emitting device comprising (100): a semiconductor excitation light source (102) emitting blue-violet light (Column 6, lines 30-35) *(prior art teaches range which includes uv and blue light*), and a solid material illuminant (101) (column 8,lines4 3-50) that is made up of a medium that transmits the blue-violet light with low loss and an absorbent for absorbing (column 10, lines 15-20) said blue-violet light (*Examiner note: the examiner notes the solid material illuminant is a phosphor material which is activated by a rare earth element, by activating with a particular rare earth element enhancing absorption an the luminance characteristics of the material, as such examiner has take "the absorbent" to be the activator for the phosphor and a separate compound)* the absorbent containing Sm of 0.01 to 10 mol% (column 13, lines 15-20)

(*examiner prior: art teaches that the sm content should be between .0003-.08; which not only adds in absorption but improves the temperature characteristic of the device)* wherein said solid material illuminant radiates light by inner shell transition of the Sm contained in the absorbent absorbing the blue-violet light Shimizu is silent regarding wherein said solid material illuminant medium contains at least one of nitrides of Ga, In, and Al.

In the same field of solid state devices, Kelsey, JR. teaches a rare earth nitride wherein said solid material illuminant medium contains at least one of nitrides of Ga, In, and Al (¶ 15) in order to provide a device that is highly efficient electroluminescent emitters (abstract).

Therefore one of ordinary skill in the art at the time of the invention could modify the display of Shimizu wherein teaches a rare earth nitride wherein said solid material illuminant medium contains at least one of nitrides of Ga, In, and Al (¶ 15) in order to provide a device that is highly efficient electroluminescent emitters as taught by Kelsy, Jr.

Regarding claim 13, Shimizu teaches wherein said blue-violet light has a peak wavelength in the range of 398 to 412 nm (column 6, lines 30-35) (*Examiner note: prior art reference teaches the range of 400-530 nm which includes a portion of the claimed range)*

9. 14-15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al. (US 5,998,925) in view of Kelsy Jr. (US 2002/0158267 A1), as applied to claim12, and in further view of Henrichs (US 6,625,195 B1).

Regarding claims 14-15, Shimizu as modified by Yamada et al. teaches the light-emitting device set forth above (see claim rejection 1). Shimizu as modified by Yamada et al. is silent regarding wherein said a semiconductor laser device having a narrow spectral line width of lasing (claim 3) with an active layer of InGaN semiconductor (claim 11).

In the same field of endeavor of light-emitting devices, Henrichs teaches wherein said is a semiconductor laser device having a narrow spectral line width of lasing (column 2, lines 45-48) with an active layer of InGaN semiconductor (column 2, lines 28-30) in order to provide a device with improved current correction that allows for beam coherence and laser beam divergence (column 2, lines 10-15).

Therefore one of ordinary skill in the art at the time of the invention could further modify the light emitting device of Shimizu wherein said semiconductor excitation light source emitting blue-violet light is a semiconductor laser having a narrow spectral line width of lasing with an active layer of InGaN semiconductor in order to provide a device with improved current correction that allows for beam coherence and laser beam divergence as taught by Henrichs.

Regarding claim 18, Shimizu teaches wherein said red phosphor contains at least either Sm or Eu (Column 12, lines 60-65 and column 13, lines 5-14).

10. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al. (US 5,998,925) in view of) in view of Kelsey Jr. (US 2002/0158267 A1) as applied to claim 12, and in further view of Cheetham et al. (US 2005/0077499 A1).

Shimizu as modified by Yamada et al. teaches the light-emitting device set forth above (see claim rejection 1). Shimizu teaches wherein the solid illuminant can comprise a mixture of two or more materials (Column 19, lines 30-35). Shimizu as modified by Yamada et al. is silent regarding wherein said solid material illuminant contains a red phosphor having a peak wavelength in the range of 600 to 670 n , a green phosphor having a peak wavelength in the range of 500 to 550 nm and a blue phosphor having a peak wavelength in the range of 450 to 480 nm.

In the same field of endeavor of display devices Cheetham et al. teaches wherein said solid material illuminant contains a red phosphor having a peak wavelength in the range of 600 to 670 nm (Paragraph 20, line 5) (*examiner note: prior art reveals 580 to 700 for red)*, a green phosphor having a peak wavelength in the range of 500 to 550 nm (Paragraph 20, line 4) (*examiner note: prior art reveals 500-580 for green)* and a blue phosphor having a peak wavelength in the range of 450 to 480 nm (Paragraph 20, line 5) (*examiner note: prior art reveals 400 to 500 for blue)* in order to effectively capture emission from GAN-based emission over a wide wavelengths thus increasing the luminous efficiency of the device (¶5).

Therefore one of ordinary skill in the art at the time of the invention could modify the device of Shimizu wherein said solid material illuminant contains a red phosphor having a peak wavelength in the range of 600 to 670 n , a green phosphor having a peak wavelength in the range of 500 to 550 nm and a blue phosphor having a peak wavelength in the range of 450 to 480 nm *)* in order to effectively capture emission from

GAN-based emission over a wide wavelengths thus increasing the luminous efficiency of the device as taught by Cheetham et al.

11. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al. (US 5,998,925) in view of Kelsey Jr. (US 2002/0158267 A1), as applied to claim 12, in view of Henrichs (US 6,625,195 B1) as applied to claims 14 and 15, and in further view of Juestel et al. (US Patent 6,084,250).

Shimizu as modified by Kelsey et al. and Henrichs teaches the light-emitting device set forth above (see rejection claim 15). Shimizu teaches where two or more phosphors are contained in the mixture and contain rare earth elements (Column 19, lines 30-35)

Shimizu as modified by Kelsey et al. and Henrichs is silent concerning the red, the blue and the green phosphor each has rare earth elements.

In the same field of endeavor of light-emitting devices, Juestel teaches wherein said red phosphor (for example, YVO_4:Eu), said green phosphor (for example, BAM: Eu activated) and said blue phosphor (for example, BAM:Eu activated) each contain rare earth elements (Column 4, table 1) in order to provide a device with high color rendering to display light efficient and intense image (Column 1, lines 54-56).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify light-emitting device of Shimizu wherein green, red and blue phosphors each contain a rare earth element in order to provide a device with high color rendering to display light efficient and intense image as taught by Juestel et al.

Response to Arguments

12. Applicant's arguments with respect to claims 1 and 12 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 2004/0135504 A1 teaches a gallium nitride based phosphor doped with sm. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracie Green whose telephone number is (571)270-3104. The examiner can normally be reached on Mon-Thurs 7:00am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on 571-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tracie Green/
Examiner, Art Unit 2879

/Sikha Roy/
Primary Examiner, Art Unit 2879